

From: Ron Borsellino/R3/USEPA/US
Sent: 10/1/2012 9:37:07 AM
To: Jon Capacasa/R3/USEPA/US; Johnson.KarenD@epamail.epa.gov
CC:
Subject: Fw: Dimock Article from Sunday's Times Tribune

See below

Sent by EPA Wireless E-Mail Services

----- Original Message -----

From: Laura Mohollen

Sent: 10/01/2012 07:23 AM EDT

To: Ron Borsellino; Kathy Hodgkiss; Dennis Carney; Roy Seneca; Shawn Garvin; William Early; Terri-A White; Jon Capacasa; KarenD Johnson; Catherine Libertz

Subject: Dimock Article from Sunday's Times Tribune

FYI: Several EPA staff and documents reference from FOIA articles.

<http://thetimes-tribune.com/news/gas-drilling/are-leaking-wells-letting-methane-get-into-dimock-s-water-1.1381012>

Are leaking wells letting methane get into Dimock's water?

By Laura Legere (Staff Writer)

Published: September 30, 2012

More than two years after the state halted a natural gas driller's operations in a corner of Dimock Twp., the right answer to a last question is all that stands between drill bits and earth.

Are leaking wells still allowing gas to escape into residents' drinking water?

Water samples taken during a recent federal investigation in the Susquehanna County village suggest that methane problems persist.

The U.S. Environmental Protection Agency ended its investigation of potential water contamination from natural gas drilling in July, yet it has publicly synthesized very little of the more than 100,000 pages of information it gained during six months of sampling and data-gathering in Dimock.

In official statements, the agency said it set out only to determine whether the water in Dimock is safe to drink and found that in most cases it is or can be treated to safe levels.

But emails released to The Times-Tribune and sampling results posted online show that an early focus of the EPA's interest in Dimock - the continued cause of high levels of gas in private water wells and the options for removing it - was largely dropped from the investigation the agency ultimately pursued in the township even though the EPA found methane above state review limits in a third of the private water wells it sampled.

Documents:

[Letter to Cabot from The DEP](#)

Released Emails

The state Department of Environmental Protection has been conducting the main investigation into Dimock methane contamination since 2009, when gas ignited in a water well and blew apart its concrete cover.

Methane is not considered toxic in drinking water but it can create a risk of explosion or asphyxiation if it escapes from water and becomes trapped in confined spaces.

Enough methane can also influence levels of some nuisance metals in drinking water, including manganese, a correlation that was explored by the EPA.

To resume drilling new wells in a 9-square-mile area of Dimock, Cabot Oil and Gas Corp., the operator deemed responsible for the contamination, must prove through regular testing that methane has stopped leaking from its wells or that the methane in the aquifer has returned to background levels.

In late August, the state DEP announced that seven Cabot gas wells that had never been hydraulically fractured were not to blame for the problems in Dimock, and Cabot could complete the work necessary to produce gas from the wells.

Hydraulic fracturing, or fracking, extracts gas from tight rock by cracking it with chemically treated water and sand under high pressure, and is a separate process from drilling a well.

A settlement the state signed with Cabot nearly two years ago outlines what else the company must do to demonstrate that the methane leaks have stopped: Cabot must screen 18 methane-tainted water supplies until there is less than 7 milligrams per liter of methane dissolved in the water and no airborne gas dangerously trapped in the wells.

The company must also show that, for two straight years, the dissolved methane in each well is at or below the 7 milligrams per liter threshold in 75 percent of regular water tests. No sample can have more than double that amount of gas.

The state can waive those requirements if it finds that the methane levels in the water now reflect natural conditions unrelated to shale development - a tricky task because no methane samples were taken before drilling began.

DEP has not yet determined that Cabot has satisfied all of the obligations outlined in the settlement, including "demonstrating the gas wells are no longer introducing methane into the aquifer," spokesman Kevin Sunday said.

Gas in the water

Beginning in January, federal regulators tested for methane in Dimock and found it.

In the 59 water wells the EPA analyzed for dissolved methane, 20 had more than the state's threshold of 7 milligrams per liter of the gas in the water, 15 of those had double that amount or higher and five had four times the threshold - the point when the gas begins to escape from the water and create a potential explosion risk if not treated or vented.

Only six of the 20 water supplies with elevated methane apparently had treatment to remove the gas at the time of the testing, because methane levels at the tap were much lower than those recorded close to the well.

A report posted online by the EPA's Dimock site coordinator this month described how sampling was disrupted at one home in January because "explosive levels of gases were detected" in the shed that holds the home's water treatment system and the sampling team was forced to "(open) the door to the shed for ventilation, (apply) a tube to the spigot and (collect) the samples from a distance from the tap."

The prevalence of high methane levels in the sampled Dimock wells - 34 percent - is much greater than the rate documented during baseline water sampling in northeastern and north-central Pennsylvania more broadly.

Pre-drilling water samples taken by another shale operator, Chesapeake Energy, in Bradford, Susquehanna, Wyoming, Sullivan and other regional counties, found methane at or above the state's 7 milligrams per liter threshold in only 3.4 percent of more than 11,000 water wells, according to research presented at an industry conference on Sept. 13.

The state is reviewing the EPA's data as it evaluates whether Cabot has met its obligations under the settlement, Mr. Sunday said.

Asked whether the EPA tests might show the methane migration in Dimock has affected more homes than previously thought, he said the state has "not drawn any conclusions from the data at this time."

'Exactly like Marcellus methane'

In addition to measuring the amount of methane it found in Dimock water supplies, the EPA performed a type of testing commonly used to determine where the gas came from.

The analysis, a form of chemical fingerprinting, studies stable isotopes in the methane for signs of its origin. It can help distinguish between deep gas harvested by drillers, shallow gas caused by the breakdown of organic material and gas trapped in middle rock layers that can sometimes find natural pathways or travel up flaws in gas wells to drinking water.

The EPA posted the results of its isotopic tests from 12 wells online but the regional EPA office that led the investigation did not attempt to interpret the data because it is "complex and beyond the scope of the efforts in Dimock," agency spokeswoman Terri White said in an email. Instead, the office forwarded the information to a branch of the EPA that is conducting a national study on the effects of hydraulic fracturing on drinking water.

"The results are not helpful in evaluating the actual drinking water quality of the well water - which was the primary goal of the agency's effort in Dimock," she wrote.

State regulators agree that the isotopic data is complex and the gas signatures in the region are "highly variable," Mr. Sunday said. The DEP is studying the data as part of its review of Cabot's compliance with the settlement.

Outside scientists that have reviewed the data disagree about whether it can be used to draw conclusions about the methane's origin without past tests to compare it to. Such comparisons are difficult because the EPA stripped identifying information about the water wells to protect the Dimock homeowners' privacy when it released the test results.

Fred Baldassare, the DEP's former stray gas inspector - now in private practice - whose work helped build the state's case that faulty Cabot wells caused methane contamination in Dimock water in 2009, said it would be "inappropriate" and "very shortsighted" to try to interpret the EPA's isotope data without considering previous tests that were likely taken from some of the same wells.

Methane that looks like it originated deep underground might instead be residual gas from a shallower source that has changed over time because the source is no longer discharging methane into the groundwater system, he explained. A signature that has stayed the same, on the other hand, might point to a continuing discharge of methane into aquifers.

But Robert Jackson, an environmental scientist at Duke University who co-authored a 2011 study showing a correlation between gas drilling and methane in Northeast Pennsylvania water wells, said the "simplest explanation" - methane contamination from deep rocks - is the likeliest. The signatures of the methane and ethane gathered by the EPA show evidence of two kinds of contamination related to natural gas drilling, he said: gas that moves from middle rock formations through imperfections in the cement between steel casings in the wells and deeper gas that leaks out through poor casings.

In between three and five of the samples posted by the EPA "the methane in the water looks exactly like Marcellus methane" in Susquehanna County and ethane signatures appear to confirm that conclusion, he said.

"I don't think there's a natural pathway for this," he said and argued that the new results buttress Duke's earlier findings.

"There are people who say there is nothing going on in Dimock and I think that's wrong, based on the evidence."

Cabot says that its wells are not leaking methane into Dimock aquifers, and they never were.

Where methane levels have not declined enough to meet the standards outlined in the state settlement, Cabot is building a case that the methane levels reflect natural conditions.

Cabot employees co-authored a December 2011 study that found detectable levels of naturally occurring methane in nearly 80 percent of water wells it sampled before drilling nearby in Susquehanna County, where drinking water is frequently drawn from rock layers charged with gas.

The study found higher levels of methane correspond to water wells drilled in valleys and have no relation to proximity to gas wells. (The authors described the range of detectable methane as less than .0001 milligrams per liter to greater than 10 milligrams per liter, but did not report how frequently Cabot found methane levels above the state threshold in water before drilling.)

A Cabot spokesman said the company's review of the methane isotope data does not show a match to the Marcellus Shale.

In a prepared statement, spokesman George Stark said, "After the EPA investigated claims and tested, and retested, water samples, the agency announced on July 25 that it would cease deliveries to residents currently receiving water because the agency 'determined that it is no longer necessary to provide residents with alternative water.'

"The EPA released data that once again confirmed the agency's and DEP's findings that levels of contaminants found do not pose a threat to human health and the environment."

'A large number of wells with problems'

When EPA scientists first responded to Dimock residents worried about the safety of their drinking water late last year, methane contamination was seen as a central sign of the problems in Dimock.

Two months before the EPA officially declared its intention to sample water supplies in Dimock, two

EPA officials wrote to the state's head oil and gas regulator, Scott Perry, to raise concerns about levels of gas and other contaminants in private Dimock wells that might be linked to Cabot's drilling.

The messages, released to The Times-Tribune in response to a Freedom of Information Act request, outline the possibility of a much broader federal action than the one eventually taken by the EPA in the town.

The federal regulators, Karen D. Johnson and Jon Capacasa, questioned the effectiveness of Cabot-installed treatment systems in removing metals, organic chemicals, radionuclides and gases that periodically showed up in tests of private water wells in Dimock. They raised concerns about the long-term reliability and maintenance of the treatment systems, and described the difficulty of verifying if Cabot's efforts to plug or patch suspected faulty gas wells had stopped the flow of methane into shallow aquifers.

"It is clear from the volumes of data that DEP has collected, and Cabot in the Dimock area, that there are ground water effects on the private wells, and that in some cases the treatment systems installed at least by Cabot in Dimock, are not capable of removing all the contaminants," Ms. Johnson wrote.

"I'm particularly concerned that several of the homes with treatment have the highest levels of propane, ethane and ethene, after treatment," she continued, referring to other combustible gases that sometimes coexist with methane. "It may be that the samples were during a 'shake down period' on the treatment, but in talking to the residents that are using the treatment systems, they really don't have any confidence that they can drink their water."

Ms. Johnson and Mr. Capacasa proposed that further tests of the structural integrity of Cabot's gas wells or more remediation might be necessary to eliminate the methane problem. They suggested that because high methane levels persist in private water wells "the only means of remedying it" could be to have Cabot drill shallow gas wells to "draw off the pressure" in rock layers above the Marcellus Shale.

Later in the emails, the officials also suggested that the federal agency could invoke its authority under the Safe Drinking Water Act to regulate some of Cabot's wells if allegations that the company used diesel fuel to hydraulically fracture at least two early Dimock wells proved true. A 2005 rule exempted the fracking process from federal regulation as long as diesel is not used.

Ms. Johnson wrote that federal authority could give regulators tools to confirm if the gas wells are structurally sound.

"They certainly had a large number of wells with problems," she said.

The agency did not take that route. A lawyer for the regional EPA office said the agency never asked Cabot if it used diesel in its wells because the EPA was still working at the time to define what it meant by "diesel" as it developed regulations for wells fracked with the fuel. A Cabot spokesman did not respond to a question about the allegations of diesel use.

Instead, the agency said in January that "the presence of hazardous substances" in drinking water compelled it to act under the Superfund law to deliver fresh water to four homes and conduct sampling at 64.

In the end, the EPA did not evaluate the effectiveness of any methane treatment systems, try to determine the source of methane or any other contaminant in Dimock drinking water wells, or require any remediation actions from Cabot, Ms. White, the agency spokeswoman, said.

As it reviewed sample results from Dimock, the EPA notified residents, the state and the county emergency management agency whenever it found that a well had enough gas in it to pose a potential explosion risk.

The EPA's goal "was to provide the Dimock community with reliable information about the presence of contaminants in their drinking water and determine whether further action by EPA was warranted to protect public health," she said. The emails sent by agency officials to the state prior to the investigation are "indicative of routine communications" the agency has with the state to offer "technical advice."

"We recognize that PADEP has jurisdiction over private wells and oil and gas operations including the situation in Dimock," she said.

State investigation

DEP spokesman Kevin Sunday said the settlement the state reached with Cabot already addressed the EPA officials' concerns about the company's obligations to restore private water wells it disrupted.

Money Cabot paid into escrow accounts was meant to allow residents to buy and maintain treatment systems or replacement water, he said. The company also had to offer to install methane-removal systems on 18 affected water wells, but the settlement does not explicitly require Cabot to inspect or maintain the systems at the homes that took them.

Mr. Stark, the Cabot spokesman, defended the treatment systems by saying that "all were approved by DEP."

The DEP also rejected the EPA officials' suggestion of drilling shallow wells to get rid of the gas in Dimock's aquifers.

"Relief wells treat only a symptom and do not eliminate the source of the methane," Mr. Sunday said.

Since December 2010, the DEP has been evaluating Cabot's efforts to comply with the settlement and enforcement order that will allow it to resume full operations.

The thoroughness of the DEP investigation in Dimock is one reason state regulators bristled when the EPA began its own investigation in the town. The state has required Cabot to submit details about pressure built up in its wells, efforts to patch potential leaks, water samples collected before and after drilling in Susquehanna County, and characteristics of the gas the company found in the water.

The state received a list of 33 homes where Cabot at some point delivered replacement water to homeowners who were concerned that drilling had affected their wells, then regulators went to the homes and tested the water.

In its review, the state found a new case of methane leakage: regulators blamed at least one of four gas wells Cabot drilled on the Shields property in Springville Twp. - west of the off-limits area - for more than tripling methane levels in one water well to 84 milligrams per liter after Cabot began drilling.

Whether and when Cabot is allowed to drill new wells in the off-limits section of Dimock rests with the state.

On the same day DEP granted Cabot permission to frack but not drill new natural gas wells in the area, Mr. Perry, the department's deputy secretary for oil and gas management, wrote back to a

township resident who asked in late July, "Exactly what is the hold up?"

"Simply put," he wrote, "more data needs to be evaluated."

Contact the writer: llegere@timeshamrock.com

Laura A. Mohollen
Pennsylvania/ West Virginia
State and Congressional Liaison
U.S. EPA Region 3
1650 Arch Street (3CR00)
Philadelphia, PA 19103

phone: 215-814-3295
fax: 215-814-5102